CICEET
Serving the technology needs of coastal managers

About CICEET

Established in 1997, the Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET) is a partnership of the National Oceanic and Atmospheric Administration (NOAA) and the University of New Hampshire (UNH). Through strategic partnerships and direct investments, CICEET develops tools for clean water and healthy coasts nationwide. CICEET's toolkit contains dozens of field ready technologies—with many more in the pipeline—that address coastal resource problems in three ways:

- Detection: tools to detect pollution
  CICEET has sponsored the development of a wide range of sensors, microbial rapid detection methods, Harmful Algal Bloom (HAB) detection and identification, and technologies to collect, relay, and synthesize data.

- Recovery: tools to treat pollution and restore habitats
  These include technologies to restore and protect shorelines, such as a multi-beam bathymetric model to map the ocean floor in high energy coastal environments, *in situ* sediment remediation technologies, and predictive models and methods for seagrass and saltmarsh restoration.

- Prevention: tools to prevent the impacts of pollution
  These include a unique stormwater treatment evaluation center, methods to reduce nutrient pollution, and models to predict and prevent the impacts of land use change.

CICEET & NERRS

Collaboration with the National Estuarine Research Reserve Sysem (NERRS) is at the heart of CICEET's mission. The reserves' geographic and ecological diversity provides a living laboratory in which CICEET investigators develop and test effective tools for coastal managers. The local and regional networks the reserves foster are important conduits through which CICEET technologies can reach the people who need them most. At the same time, CICEET supports the goals of the reserves and addresses the needs of the communities they serve.

Here's how:

- Key Infrastructure: CICEET invests in the equipment needs of the NERRS, including datalogger upgrades to YSI's extended deployment system, the purchase and evaluation of *in situ* YSI flourometers, and computers to support the GIS capability at every reserve.

- SWMP Support: CICEET is an engaged partner in the NERRS System-Wide Monitoring Program (SWMP), part of the national backbone of IOOS, the Integrated Ocean Observing System. Since 1998, CICEET has invested $2,007,736 in SWMP-related infrastructure and technology demonstration and evaluation projects. CICEET also supports the training of reserve personnel in monitoring-related technologies, and contributes to the NERRS' ability to provide timely and accurate water quality data.

- Needs Assessment: CICEET works with the NERRS to define the priority technology needs of their local coastal resource managers. These assessments help CICEET design competitive funding programs that focus the expertise of leading researchers on the development, demonstration, and application of innovative tools for coastal management.

- Focus on NERRS: CICEET brings the talents of leading researchers to bear on the development of technology to address issues related to the NERRS mission. Every project funded by CICEET's Environmental Technology Development Program (ETD) must have a connection—through research, technology development, demonstration, or outreach—to a NERRS site or its watershed. NERRS personnel often serve as advisors or primary investigators for CICEET projects.

- Serving NERRS Customers: CICEET's partnership with the NERRS Coastal Training Program (CTP) helps bridge the distance between available tools and the coastal managers who need them, through outreach, training, and communications materials. For example, the CICEET-sponsored UNH Stormwater Center is a resource for CTP coordinators engaged in helping land use decision makers develop stormwater management programs to protect water quality.

Learn more

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CICEET & Washington

Padilla Bay, located in the Salish Sea, is part of a large river delta in a fjord estuary. The 11,000-acre Padilla Bay National Estuarine Research Reserve encompasses extensive seagrass meadows, tidal flats and sloughs, salt marshes, and upland forests and meadows. The reserve coordinates research, education, and stewardship programs to promote better understanding and management of Washington's coasts.

Padilla Bay is also a living laboratory for CICEET investigators who test solutions to the challenges that coastal resource managers face in a developing landscape. These scientists and technology innovators develop tools to prevent or reduce development impacts on fragile coastal ecosystems that are important economic and cultural resources for the state.

Investing in Washington

CICEET has invested nearly $500,000 in technology development and demonstration projects to address the priority needs of Washington's coastal resource managers. Many of these projects have been concerned with tracking changes in coastal habitats and evaluating the overall quality of coastal waters. Here are some examples:

Nitrogen Source Tracking: Excess nitrogen poses a growing threat to coastal aquatic ecosystems and the industries that depend on them. Since nitrogen flows into coastal waters from human and natural sources, monitoring its origins and quantity can be a challenge. This project identified a combination of nutrient and isotope measurements to determine how much nitrogen in coastal and estuarine waters could be attributed to human sources.

Mapping Eelgrass: Eelgrass serves as a critical habitat for marine life and removes excess nutrients to help improve water quality. Traditional methods for monitoring changes in habitats like eelgrass, such as sophisticated aerial photography, can be complicated, expensive, and time consuming to use. This project developed an accessible, new methodology to map and monitor eelgrass cover and density by using a combination of aerial photography and commercially available computer software.
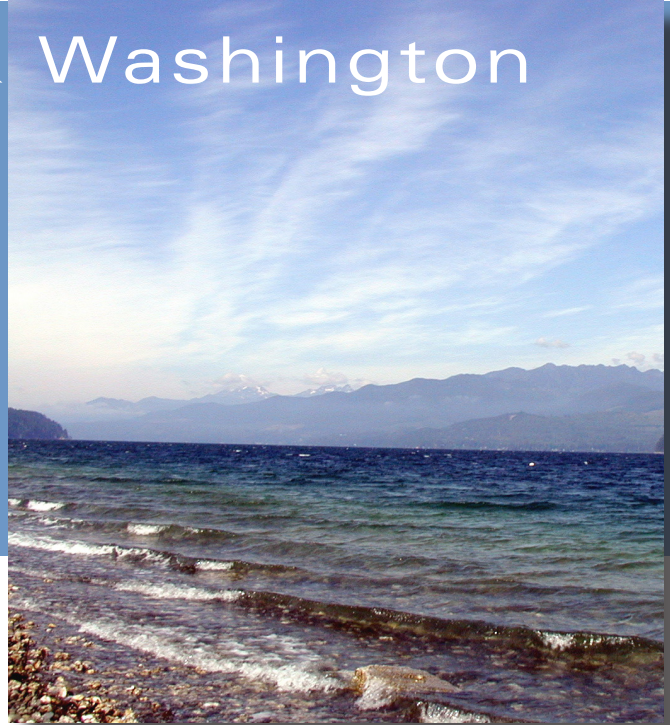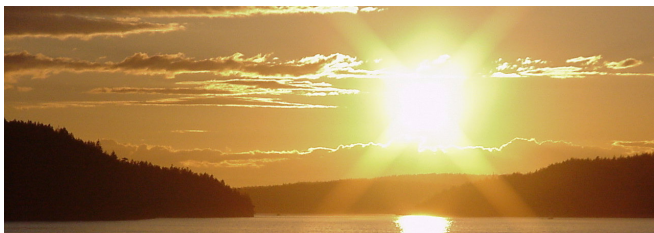
Groundwater Tracker: As it moves through soil, groundwater can pick up nutrient pollution and deliver it to coastal waters. To treat this problem, managers must know the source of the contamination. Historically, measuring groundwater has been a time-consuming, labor-intensive process. This CICEET project developed a system that uses radon as a proxy to map groundwater discharge zones in coastal waters.

Taking the Pulse: Taking the pulse of ecosystems and water quality requires sophisticated technology and a staff that knows how to use it. CICEET's overall investment in NERRS monitoring programs has enhanced the individual capacity of the Washington Reserve's ability in this regard.

Learn more

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For more information on this reserve, visit:
nerrs.noaa.gov/PadillaBay

Tools for Clean Water & Healthy Coasts

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